100 ADMISSIONS TO A PSYCHOPATHIC UNIT

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THIS paper reports the work of a clinical team on 100 consecutive first admissions to a unit constructed for the treatment of psychopaths at Balderton Hospital, Newark, Notts, and opened 1958–61. To prevent bias all male admission with behaviour disorder admitted between 1958–60 are here reported except: five admitted for observation of less than a week, twenty-two admitted only for remand, and those with a Wechsler or Stanford Binet I.Q. less than 56. The unit specialized in delinquents with mental disorder, and received admissions from all over Britain.

The work of the unit and the method of treatment employed have been previously reported (8, 9). A review of the literature on diagnosis, aetiology, natural history, prognosis, and treatment was published in 1961 (10) by one of the authors. Previous psychiatric writers on the subject such as Henderson (27), Curran (12), have paid attention to clinical sub-groups and their importance for prognosis, although there have been others such as Mayer-Gross *et al.* (33) who have widened the concept of psychopathic personality to include all varieties of abnormal personalities predisposing to neurosis and psychosis. An attempt has been made in this investigation to define significant clinical sub-groups. The paper is divided into sections concerned with social background, psychiatric examination, psychological testing, and electroencephalography, followed by a discussion of relationships between the data.

SOCIAL BACKGROUND

The primary duty of Balderton Hospital lay towards the County and the City of Nottingham, with a population of just under one million, so that twenty-nine patients came from the County and twenty-one from the City of Nottingham, with thirty patients from the rest of the Sheffield Hospital Region, and twenty patients from elsewhere in Britain. Ten patients were transferred from other mental hospitals, with other psychiatrists referring thirty-three from prisons and from outpatient clinics, and seventeen from Approved Schools. Twenty-five were referred by probation officers, twelve by mental health departments without being seen by a psychiatrist, and three from the child care departments. These sources overlap, so that a number who came from mental health departments had also been seen by a psychiatrist, and in all twenty-one Approved School boys were treated. Forty patients had had prison experience prior to admission, nine having previous sentences and the rest one or more remands. Two of these patients had received previous Borstal training.

Hospital policy was to admit on a voluntary basis, so that eleven of the approved school boys were transferred with their consent on licence, the

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remaining ten in addition being on probation. In all, sixty-six patients were on probation, most with a condition of residence; fifteen others were entirely informal, whilst eight patients came in under the compulsory provisions of the mental health legislation. Thus 92 per cent. of admissions were on a voluntary basis, though of course for many the alternative was prison.

The first table shows the distribution of the hundred admissions according to age and the number of convictions. As expected, the increase of offences with age is just significant (throughout this paper the term "just significant" refers to $p<0{\cdot}05$, "significant" where $p<0{\cdot}01$ and "highly significant" where $p<0{\cdot}001$, two tailed tests being used in all cases).

TABLE I

Age and Convictions

Convictions	Age 13–14	Age 15–19	Age 20–24	Age 25–29	Age 30+	Totals
0	1	9	2	1	1	14
1 or 2	4	27	8	2	2	43
3+	—	21	10	7	5	43
Totals	5	57	20	10	8	100

The mean number of convictions was 3·1 per patient and the mean age 18·3 years, most falling into late adolescence. Of the fourteen having no convictions, five confessed to sexual or acquisitive offences, no police action being taken on their being admitted to hospital, whilst the remaining nine were behaviour problems within the family.

Property offences were committed by fifty-five boys, two further committing arson. Twelve committed bodily violence. Sexual offences consisted of seven against young boys, five against little girls, two with violence against women, three with men and five indecent exposures, making twenty-two in all.

The following table summarizes parental separation from the child during its formative years.

TABLE II

Parental Separation from Child

Parental absence during each 5 year period	Age of Child 0–4	5–9	10–14
Both throughout	7	13	24
Father throughout	12	11	17
Mother throughout	3	4	4
Both away over one year	20	14	
Father away over one year	4	3	9
Mother away over one year	0	10	
Totals	46	55	54

Only thirty-one boys spent their formative years to the age of fourteen with both parents, or with a parent substitute such as grandparents or adoptive parents. Although for many the war caused parental absence during the early years, the later periods reflect the increasing numbers of desertions and separations, and for those aged 10–14 the increasing number placed in institutions or homes. In general partial separation suffered early tended to become more complete as the years advanced. However, no statistically significant relationships are found between extent or degree of parental deprivation, and other social, psychiatric, psychological or EEG variables, nor with reconviction or job holding at follow-up.

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Parental separation, although perhaps the most definite indication of family stresses, can be a superficial measure, as Wootton (47) has pointed out. In this study, note was taken of the degree of affection or resentment the patient appeared to feel for his mother and father on a simple three-point scale, at the time of admission. Likewise the patient's views, the social worker's report and each parent's views were considered in evaluating the degree of paternal and maternal discipline, using a five-point rating scale culled from the Gluecks (24). Since the recent prediction studies of Mannheim and Wilkins (31), the Gluecks (24) and the McCords (30) have shown the importance of family cohesion, this too was noted. The scale comprised, (*i*) admission from an apparently affectionate home; (*ii*) admission from an apparently discordant home; (*iii*) not admitted from home, but in touch with one; (*iv*) neither admitted from home nor in touch with one. Relationships between parental attitude, discipline, family cohesion and other factors are described later.

The distribution of social class of parents closely followed that of the Registrar General's returns for the country. The father of one boy was in social class 1; nine in class 2; forty-five in class 3; fourteen in class 4; and thirteen in class 5. Nineteen were unrecorded or unknown.

It was hoped to throw some light on possible genetic predisposition by investigating the number of parents who were known to have had psychiatric hospital admission. There were eighteen such admissions out of 191 parents for which data were available, giving an incidence of 9·5 per cent. For the general population it is possible to work out the expectation of admission to psychiatric hospitals at age 16 onwards through adult life from the working sheets of data supplied to the 1954-57 Royal Commission on Mental Illness, by the General Register Office. Based on first admission and death rates in 1954 of 10,000 males or females born the expectancy of admission sometime during life would be 5·2 per cent. for males and 7·0 per cent. for females.

There is an interesting difference between these figures and those for the parents of the 100 admissions, which appears to be a real one although exact comparisons are not possible.

Psychological Investigations

Employing the Wechsler Adult Intelligence Scale and the Wechsler Bellevue II, the group of 100 admissions obtained a mean I.Q. of 83 with a standard deviation of 15. Twenty-four boys scored I.Q.s 56–69, eighteen 70–79, twenty-three 80–89, twenty 90–99, and fifteen over 100. The performance I.Q. tended to exceed the verbal I.Q., the mean performance-minus-verbal I.Q. being 4, with a standard deviation of 12. Sixty-five per cent. gave higher performance than verbal I.Q. Some implications of this result will be discussed later.

Taking the group as a whole, the behaviour in the test situation was characterized by reluctance to deal with unnecessary trivialities. Patients preferred to avoid any friendly inquiry into their own lives, or any preliminary to the test. They were also characterized by lack of effort, and gave the observer the impression that their interest was more apparent than real. This was supported by the fact that the variabilities of I.Q. on retest were rather greater than normally found, which suggests that the population as a whole was rather unreliable from the point of view of testing. In those patients who received alternative versions of the Wechsler on admission and discharge, there was no significant rise of I.Q. This finding contrasts with those of Clarke and Clarke (6) and Craft (7) who found significant rises following several years' treatment. Treatment at Balderton was relatively short.

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The Rorschach was administered in the traditional manner to 91 of the patients and scores were obtained for the two determinants of colour and shading which are probably important in relation to psychopathic deviation (Tong, 45). Records were also scored in terms of a "Severe Disturbance Scale" developed by one of the authors (Burnand, 5) by successive refinement involving comparison with psychiatric diagnosis, and primarily intended for the separation of neurosis from psychosis. The scale involves two subscales, "thought disorder" and "withdrawal". The first is scored in terms of "confabulation", defined in wider terms than traditionally, and relating to the general quality of verbal responses, and of "perseveration", "fluidity", and perception of form. The second scale deals with the implications of withdrawal in the responses. By means of rules and examples, scoring becomes sufficiently reliable without special training, after practice with about ten records. Scores are obtained separately for each of the ten cards of the test, so that it is possible to study results with particular cards.

Another separate scale aimed at measuring psychopathic tendencies was developed and was based on the antisocial implications of the Rorschach responses. This was modified in the same manner as the first scale, using the psychiatric diagnosis of psychopathy as a criterion. This scale was at an earlier stage of development than the "Severe Disturbance Scale" and its validity and reliability were likely to be less.

All Rorschach scoring was carried out without knowledge of psychiatric assessments or other test results, except for the W.A.I.S., which preceded the Rorschach in the test interview.

The group as a whole appeared to be rather severely disturbed, with 16 per cent. giving scores characteristic of a psychotic (mental hospital) population. Many of the records were limited in number of responses, with little use of determinants other than form, 46 per cent. giving no response to colour, and 55 per cent. no texture responses. This unembroidered type of record has been observed with psychopathic groups by other workers, and is supposed to relate to immediate and direct as opposed to delayed and indirect expression of impulse, together with lack of affect (4), but may be partly due to guardedness (34).

In this sample 72 per cent. showed raised scores on card IV, several subjects rejecting the card. Earlier work (Burnand, 5) showed raised scores by paranoid and psychopathic groups on this card, traditionally the "father" card, which it is suggested may represent an inability to adopt submissive attitudes, especially toward authority figures. In general the outstanding characteristics were mainly of severe disturbance and limited responsiveness.

The Porteus Maze Test was given to a consecutive group of sixty-seven patients. The "Q" score, which is the sum of the qualitative errors (e.g. "lift pencil", "cross lines"), has been found repeatedly to discriminate successfully between delinquents and non-delinquent controls (21). It has been suggested that a high "Q" score represents a carelessness, lack of foresight, and impulsiveness characteristic of delinquents. The phenomenally high "Q" scores obtained in the present study by some individuals, using Porteus' (35) recommended weighting system (e.g. one subject lifted his pencil 65 times, the weighting for "lift pencil" being 3) caused us to take heed of the various criticisms of this system (21) and to adopt an unweighted scoring system as recommended by Fooks and Thomas (17). This reduced the range of scores from 2–279, to 2–80. Using this unweighted system, and the cut-off "delinquent score" recommended, the following results were obtained:

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Mean "Q" score (unweighted)	Cut-off score	No. above cut-off score	S.D.	N.
23	16	42	16	67

The mean is well into the delinquent range, although the percentage above the cut-off score is slightly less than in other delinquent populations, 63 per cent. as against at least 74 per cent. in other reported studies (17). This result accords with Gibbens' suggestion that the "Q" score is "commonly high among the psychiatrically normal subcultural type of delinquent", for delinquents admitted to Balderton were selected on the basis of their need for psychiatric treatment. It should be noted in passing that high "Q" score correlated to a highly significant extent with low intelligence, which casts doubt on the independent nature of the "Q" score.

The independent form of the Minnesota Multiphasic Personality Inventory (M.M.P.I.) was administered to a consecutive group of 47 subjects. As over 30 per cent. of those who did the test produced invalid records, either by a high F (Invalidity) score, or a high L (Lie) score, few conclusions can be drawn. No reliable correlation between invalidity and I.Q. was found, and it is felt that the reasons for this high invalidity are complex. Although all could read, some were slow workers and soon grew weary of the task with consequent carelessness and a lack of co-operation. Gibbens (21) suggests somewhat wryly, that the feature of the M.M.P.I. most characteristic of delinquency is high invalidity. It is suggested that poor reading ability, and disinclination to do an exacting test, combined to produce this result.

Apart from this exceptionally large number of invalid records, the pattern of results followed closely the results of Hathaway and Monachesi's extensive study of delinquents (26), with raised scores on the psychopathic scale and those indicating psychosis, such as the manic, paranoid and schizophrenic. This last was unusually high for a delinquent group, even allowing for six patients later diagnosed as schizophrenic. Perhaps this underlines the severe degree of disturbance in this highly selected delinquent population.

Finally, Stott's Bristol Social Adjustment Guide (39) for "The Child in Residential Care", was filled out for a group of forty patients independently by four nursing staff for each patient. A standard method was employed to derive one final estimation from the four independent ones.

In this guide, adverse items of behaviour indicative of "unsettledness" and "maladjustment", which are to be underlined as appropriate by the observers of each subject, are sorted into eleven syndromes, nine of these representing "standard maladjusted attitudes", namely: Unforthcomingness, Withdrawal, Depression, Anxiety about Adult Interest and Affection, Hostility to Adults, "Writing Off" of Adults, Anxiety for Approval of and Acceptance by Peers, Hostility to other Peers, and Restlessness; together with Miscellaneous Symptoms of Emotional Disturbance and Miscellaneous Nervous Symptoms.

It is difficult to compare results of this study with others because of the relative scarcity of published investigations using this form of the guide with delinquents. In a study of maladjustment in probationers and controls with an alternative guide for "The Child in School", Stott (39) used the total number of adverse items checked as an indication of maladjustment in each boy. A comparison has been made between the average number of adverse markings obtained by patients in the present study. As far as the total number of adverse items is concerned, maladjustment appeared to be greater for this group than for Stott's much larger and relatively unselected group of probationers; the

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range of scores was wider and a greater proportion were "maladjusted" as against "unsettled".

For use in research, Stott (personal communication) recommended a weighting system, of one mark for every item under "unsettledness", and two for every item under "maladjustment". On this basis, a percentage score for each syndrome was calculated, and it was found that the maladjusted behaviour most characteristic of this group was in the following order: Hostility to and "Writing off" of Adults, Anxiety for other Children's Approval, Restlessness, and Depression. Withdrawal obtained the lowest percentage score. It was not possible to analyse the data in terms of Stott's "Delinquency Prediction Instrument" (41) which he derived from the guide for "The Child in School", but it is interesting that in his study the two syndromes containing the largest number of items highly predictive of delinquency were Hostility to Adults and "Writing off" of Adults. These two syndromes also contributed most to the maladjustment scores obtained in the present study.

In conclusion, the intelligence of this group of offenders with a mean I.Q. of 83 compares with Approved School boys' mean I.Q. 89·5 (23) and Borstal boys which lie between. On other tests this group shows considerable psychological disturbance, and maladjustment of an overt, explosive kind.

Psychiatric Examination

Most patients admitted to the Psychopathic Unit had considerable documentation, often extending to the early years of life. These case reports were extremely useful in filling in the background, which was often liable to misrepresentation by patients. Together with the documentation and present reports, each patient had a full psychiatric and physical examination and the results of these were tabulated on a data sheet designed at the outset to provide a comprehensive summary of the case history. This data sheet was designed in the light of previous criminological and psychopathological hypotheses.

Childhood neurotic symptoms, both past and present, were common. Physical examination confirmed that 54 of the patients at the date of examination bit their nails, and nurses' observations recorded within the Bristol data showed that over 20 per cent. of the boys still wet their beds at night, some regularly, others when excited. Residual enuresis at discharge caused distinct difficulties in re-employment and in some was extremely resistent to treatment. By comparison, some 10 per cent. of admissions in 1959 to the nearby Borstal (Lowdham) were enuretic with 7 per cent. still so on discharge, whilst 3 per cent. of the 2,406 prisoners at Wormwood Scrubs had enuresis in 1953. Twenty-one patients complained of residual childhood neurotic symptoms, these in order of frequency being phobic symptoms, speech disorder, encopresis, and tics.

Review of the literature (10) suggested that brain damage might be an important contributory cause in patients forwarded for treatment as psychopaths. Among patients giving a history of brain damage there were seventeen authenticated—eight by present neurological lesions, seven by previous documentation and previous hospital notes, with two supported by statements of relatives and other evidence. Of the seventeen, five were damaged at birth, three had childhood meningitis or encephalitis, one had a residual infantile hemiplegia, six sustained accidents from birth to fourteen years, and two sustained accidents when fourteen and over. In seven of those with accidents, there was good evidence from documents and relatives' statements that at the time the brain damage occurred there was already an existing behaviour disorder. Two, for instance, sustained brain damage in accidents at the Approved

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School to which they had been sent for their previous offences. Only two could be said to have had a personality change as a direct result of their injury. Nine of these patients had past or present epileptic fits. Four other patients with no clear history or evidence of brain damage gave a history of epileptic fits in the past.

Although careful neurological examination was made to investigate the suggestion by Stafford-Clark *et al.* (38) that abnormal neurological signs can commonly be found among psychopathic patients, it was only among the brain-damaged that such evidence was found in the present series.

Thirty-one per cent. of the boys gave a history of, or were documented as having made, an active suicidal attempt. Six boys attempted suicide whilst within the hospital. The relationship, which is significant, between suicidal attempts and intelligence is brought out by the following table:

TABLE III

Suicidal attempt x I.Q.

I.Q. / Suicide	50–	60–	70–	80–	90–	100–	110–	Totals
Attempted	–	3	4	6	12	5	1	31
Not	6	15	14	17	8	7	2	69
Totals	6	18	18	23	20	12	3	100

Of those over 16 on admission, twenty-five admitted one or more homosexual relationships with men or boys bringing themselves to climax, and twenty-one had had sexual relationships with young girls or women also to climax. Nine of these had enjoyed both. Although the figures are probably under estimates, they do suggest homosexuality to be at least as frequent as hetero-sexual relations. There was an interesting correlation between homosexuality and suicidal attempts which just reached a statistically significant level.

A psychiatric diagnosis was made after examination and evaluation of the case history. Six patients were diagnosed as having schizophrenia. One of these was a mental hospital transfer with a schizophrenic residual state thought to be more in need of long term treatment in the Unit than in his parent hospital. Three others were convicted offenders for whom no facilities were available at the parent mental hospitals, and in two the psychosis became apparent some weeks after admission. One offender was felt to have an anxiety state, one a phobic state. The behavioural abnormalities of four patients cleared up so rapidly following admission that is was clear that the home and not the patient was at fault. They were rapidly discharged, the Unit having served a useful diagnostic and social function. In Table IV these patients are shown as having zero degree of behavioural disturbance, the others being divided into four grades of severity of disturbance on clinical grounds some months after admission.

TABLE IV

Severity Grade x Legitimacy

	Severity						
Legitimacy	0	1	2	3	4	Psychotic and Neurotic	Totals
Legitimate	3	15	27	18	12	8	83
Illegitimate	1	0	1	9	6	0	17
Totals	4	15	28	27	18	8	100

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Grade 1 of behavioural disturbance is that found commonly in clinical practice among those on probation or in Approved Schools; Grade 2, in those Approved School boys or Borstal boys who are resistant to training by the staff and require considerable tact in handling; Grades 3 and 4, in those who in practice are usually found certifiable under the provisions for psychopaths of the Mental Health Act. Grade 3 would apply to markedly disturbed Approved School boys or Borstal boys; under 5 per cent. of Approved School boys in number, they are very difficult to handle at the parent unit and application may be made either for their treatment in hospital, or for discharge. In Borstal they spend much of their time in the disciplinary wing. Grade 4 is for extremely disturbed patients similar to some twenty patients previously transferred by one of us (M.C.) to one of the Special Hospitals, Rampton, Moss Side or Broadmoor. In the table the grading of severity is placed against the incidence of illegitimacy; analysis shows that the relationship between the two is highly significant. Since the grading of severity depended mainly upon one's clinical judgment as to the way a patient behaved in the hospital, and on the degree and type of his outbursts and their frequency in the past, and took no account of illegitimacy, the relationship is of interest. Illegitimacy is associated with parental absence and the development of hostile and antagonistic parental relationships; it is also associated with some community ostracism, with consequent resentment by the individual, and all these are probably of importance in the development of psychopathic personality. The incidence of 17 per cent. illegitimacy compares with 5 per cent. in the general population, the difference being significant. Illegitimacy was not related to conviction at follow-up.

It was found possible to separate fifty-three of the patients of Grades 2, 3 and 4 into two clinical sub-groups, which the earlier review of the literature has suggested might be clinically meaningful. The first clinical sub-group consisted of those with "affectionless personality". This has been described as the type of cold, hostile, loveless person, often the result of a lack of affective training or loving figures early in childhood, and capable of cold calculating actions at the expense of man, woman, property or beast, likely to result in gain to himself and sorrow for others. Such persons are lacking in interpersonal relationships, some being apathetic and inadequate rather than aggressive or violent (Bowlby, 3). The second sub-group consisted of those felt to be emotionally immature, or showing emotional instability. Such patients are characterized by marked short-circuit reactions, explosive temperament and erratic emotional response for their age. Included in the picture is a physical immaturity and a suggestion that the offences might be mixed in type and committed on the spur of the moment. Such personalities have been described as the result of erratic training by antagonistic or variable parent figures. Of the fifty-three, twenty-seven were felt to be examples of affectionless personality, and twenty-six emotionally immature or unstable. Three patients could not be placed in any of these categories.

Electroencephalographic Investigations

Three EEG studies were made with the present series. Firstly, conventional recordings were taken to serve as a base line, whilst secondly, intravenous bemegride was used as an activator in an attempt to find reaction patterns which could be more easily recognized than the rather ill-defined patterns usually found in psychopaths. A third study was necessary using bemegride activated EEGs with normal controls.

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Technique

Bipolar recordings were taken on 8-channel Edison-Swan or Offner Model T apparatus 4 hours or more after the last meal with 7 standardized electrode patterns for the routine recordings, which included overbreathing and photic stimulation. This was followed by activation with intravenous bemegride as described by Fabisch (16). This method consisted of injecting 20 ml. of 0·5 per cent. bemegride solution in amounts of 1,2,2,3,3,4, and 5 ml. at intervals of 1 minute up to a maximum of 100 mg. in 20 ml., with half minute periods of overbreathing after the third, fifth and sixth doses. The injection was terminated at the appearance of abnormalities in the EEG, or on reaching 100 mg., whichever occurred first, or in a few cases earlier for those under weight and under age. Three minutes of overbreathing followed the injection and the recording was terminated 15 minutes from the start of the injection. An EEG was recorded during bemegride activation in the last 12 patients.

The criteria of abnormality in all EEGs were those laid down by Hill and Watterson (28) and by Sessions-Hodge, Walter and Walter (36). As a wave frequency analyser was not available, the visual analysis used inevitably introduced an element of subjectivity into the appraisal. To guard against subjective error due to assessment by one judge only, a second experienced electroencephalographer was asked for an analysis of consecutive recordings before and after bemegride injection. There was a ninety per cent. agreement between the findings of the two judges for description of details and the assessment of "normality" and "abnormality".

The abnormalities most frequently seen in the routine recordings were:

1. Abnormal amounts of 4–7 c/s Theta activity and of 1–3 c/s Delta activity, usually increased by overbreathing but not by photic stimulation;

2. Asymmetries of the 8–12 c/s Alpha activity as well as of Theta and Delta;

3. Paroxysmal phenomena including generalized, unilateral or focal spikes, increased by overbreathing and often by photic stimulation, as well as focal slow waves. The signs in this last group were suggestive of epilepsy and/or gross brain damage.

The abnormalities after bemegride were, in order of frequency of occurrence:

1. Increased Theta activity;

2. Multiple spikes with slow and intermediate slow waves (Ss+W) extending from the fronto-parietal to the occipital areas, bilaterally synchronous and either more prominent on the left in the central and posterior temporal parts or apparently symmetrical, as a rule lasting from ½–3 seconds. They were precipitated by overbreathing, sometimes interrupted by eye opening, not accompanied by twitching except in a single case, and sometimes apparently accompanied by slight clouding of consciousness;

3. Diffuse irregular high amplitude (over 150–200 microvolts) slow and intermediate slow activity (Delta and Theta), developing during overbreathing and persisting after it, different in pattern, amplitude, and distribution from the overbreathing response before bemegride, usually independent from Ss+W but sometimes developing after it;

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4. Regular high amplitude (up to 100 microvolt) sinusoidal slow wave bursts;

5. Diffuse spike activity leading up to a convulsive seizure.

The responses 2, 3 and 5 will be discussed later in more detail.

Controls in the age group under investigation are difficult to obtain. Thirteen individuals were taken from among the patients investigated by Fabisch (16) who were aged between 15 and 25, were injected with 100 mg. of bemegride, and who were not on anti-convulsant drugs. This group contained only patients who, as detailed, were assumed not to suffer from epilepsy, although attacks of dizziness and blackouts had been reported. A second thirteen were male nurses from Balderton Hospital, who volunteered for the investigation. One of them had sustained a fracture of the skull in childhood with permanent deformity of the convexity, and another had recently recovered from a prolonged virus infection, probably influenza. Two groups of ten individuals each were taken from the papers of Bingle (1) and Margerison (32). None of the four groups is quite satisfactory for comparison, the first on account of their history, the second on account of higher average age, the last two on account of different techniques as well as age structure.

Results

Routine EEGs were taken of 89 patients of whom 79 received bemegride activation. Of the ten not activated: three were discharged unexpectedly before bemegride could be arranged, two of those EEGs being normal and one abnormal; two patients with normal routine EEGs were too young and small to be injected; three routine EEGs were too abnormal to risk bemegride; one had a spontaneous seizure, and one patient refused to co-operate. These ten patients had a mean age of 18 (range 14–36) and weight 124 lb. (range 91–176). It should also be noted that 17 of the patients receiving bemegride are not members of the 100 first admissions. These 17 are either readmissions or came in after the first 100. Since the criteria of admissions were similar to the 100 they have been included in the EEG section only.

There were no gross differences in age, weight, mg. of bemegride, mg. of bemegride per lb. bodyweight, between all 79 patients injected and the different sub-groups on the one hand, and between the sub-groups compared with one another on the other hand. The ranges show a wide overlap which makes it very unlikely that the differences of the mean values have any biological significance. The different effects of the injections are therefore most probably not due to differences in age and physique, but to other factors discussed in the following pages.

To summarize results detailed in Table V. In 79 patients receiving bemegride, 19 (24 per cent.) EEGs were abnormal, 60 (76 per cent.) normal before injection, whilst after injection 54 (68 per cent.) EEGs showed abnormal changes, 2 (3 per cent.) already abnormal remained abnormal, and 23 (29 per cent.) EEGs remained normal throughout. Among the 54 patients with abnormal responses to bemegride, 37 (69 per cent.) had a normal and 17 (31 per cent.) an abnormal EEG before injection. Among all 89 patients investigated, including those not receiving bemegride, there were before injection, 64 (73 per cent.) with a normal EEG and 24 (27 per cent.) with an abnormal routine EEG. One patient refused to co-operate.

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TABLE V

EEG's of 79 patients injected with Bemegride

Nos.	EEG before Bemegride	EEG after Bemegride	Mean Age Years	Range	Mean Weight lbs.	Range	Mean Bemegride mgms.	Range	Mean Bemegride mg./lb.	Range
79	Normal and abnormal	Normal and abnormal	20	15–49	143	102–196	91	30–100	0·64	0·2–0·9
8	5 normal, 3 abnormal	Seizure	22	16–49	137	107–174	88	30–100	0·64	0·4–0·9
1	Abnormal	"Epileptic" activation pattern	18		140		50		0·4	
27	Normal and abnormal	Ss+W	19	15–26	141	102–168	85	30–100	0·60	0·2–0·9
20	Normal	Ss+W	19	15–26	143	120–168	87	30–100	0·60	0·2–0·9
7	Abnormal	Ss+W	17	15–20	134	102–108	78	40–100	0·60	0·3–0·9
6	5 normal, 3 abnormal	Ss+W followed by Delta and Theta	19	16–26	146	136–168	83	75–100	0·55	0·5–0·7
18	Normal and abnormal	Delta and Theta	22	17–44	146	112–196	96	50–100	0·66	0·4–0·9
12	Normal	Delta and Theta	21	17–42	141	112–175	96	50–100	0·68	0·4–0·9
6	Abnormal	Delta and Theta	24	17–44	155	142–196	97	80–100	0·62	0·5–0·7
23	Normal	Normal	21	15–38	148	124–187	99	75–100	0·68	0·5–0·8
2	Abnormal	Unchanged abnormal	14 19		105 136		75 100		0·7 0·7	

Table VI surveys four control groups available. If the data of these admittedly unequal groups are added together, it is seen that of 46 individuals, 38 (83 per cent.) retained a normal EEG, and 8 (17 per cent.) show abnormalities.

TABLE VI

EEG's of four control groups activated with Bemegride

DATA Controls	Mean Age Years	Range	Mean Weight lb.	Range	Mean Bemegride mg.	Range	Mean Bemegride mg./lb.	Range	Result of Activation
(1) 13 patients (Fabisch)	20	15–25			100				Normal 11 Seizure 1 Ss+W 1
(2) 13 nurses from Balderton Hospital	28	20–39	167	132–200	98	70–100	0·63	0·4–0·8	Normal 10 Ss+W 1 Doubtful Delta and Theta 1
(3) 10 medical students (Bingle)					70				Normal 9 Delta 1
(4) 10 normal persons (Margerison)					150				Normal 8 Ss+W 1

The results in this group of so-called controls have to be accepted with certain reservations. They were collected from individuals in whom (Group 1) the diagnosis of epilepsy had been considered on clinical grounds at some time, and who in Group 2 included two volunteers, one with a history of head trauma, and the other with a recently protracted virus infection, who gave two of the abnormal responses. In these two groups, there are 26 individuals who are probably biased towards showing abnormal responses. Groups 3 and 4 are probably not biased in the same way.

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Comment

Systematic investigations of the EEGs on psychopaths go back to the last war, and Ellingson in 1954 (14) gave a critical survey to that date. His comments still stand: "the incidence of EEG abnormalities among psychopaths has been found with remarkable regularity to be between 47 per cent. and 58 per cent., falling with age and rising with the proportion of aggressive personalities in the study. More recent studies include the 1961 follow-up of prison psychopaths by Gibbens (19) in the series investigated with EEGs by Stafford-Clark *et al.* (20, 38) and that of Ehrlich and Keogh (13). Recent publications emphasize the difficulty in defining a psychopath and assessing quantitatively the slight deviations from an undefinable "normal EEG", especially when dealing with adolescents and young adults. Differences of techniques and apparatus and changes in the criteria of "normality" during the twenty years since publication of the first reports add to the complexity of the picture.

A different approach was tried by correlating the findings obtained from about 500 French recruits aged 20, with the help of a battery of psychological tests, and detailed analysis of EEG recordings. Psychopathic deviation, as defined by results with the M.M.P.I. test, correlated positively with slow continuous alpha activity of high amplitude, reappearing immediately after eye closure and also with Rolandic "arched rhythms". Gastaut (18) concluded that much further research is required into such relationships.

Considering the EEG patterns of psychopaths reported and illustrated in the literature and our own EEGs before bemegride, it appears that the abnormalities after bemegride are very obvious and much easier to define than those before injection. They are non-specific in the sense that they are seen also in subjects who are presumed not to be psychopaths, but the control series on bemegride activation on normal volunteers suggests that there is usually some reason for those who have EEG abnormalities to have them, and if the control series is accepted there is certainly a significantly higher incidence of abnormality in the psychopathic group. Apart from seizures, two fairly well circumscribed types of responses have been elicited which show comparatively small overlap and facilitate the correlation of EEG findings with data derived from the patient's history and from clinical and psychological data.

Relationships between the Data

In this section, results from the main lines of investigation already discussed are reported in relation to each other, and to the first follow-up study carried out one year after discharge. Particular attention is paid to relationships with type of offence, reconviction for indictable offences, present employment, and EEG abnormalities.

Reconviction and Present Employment

Few of the variables tested bore any relationship to reconviction or employment one year after discharge on the first follow-up. In particular the following variables showed no signs of being related to either; type of offence, paternal or maternal absence during childhood, the psychiatric assessment of affectionlessness or emotional instability, EEG findings, "Q" score of the Porteus Maze, or any of the M.M.P.I. scales. Those which related to employment at follow-up are: family cohesion (significant), and paternal strictness (almost significant).

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TABLE VII

Paternal Discipline and Employment

Employment	Father				
	Over-Strict	Firm and Kind	Erratic	Lax	N.R.
Employed	13	12	10	9	10
Unemployed	1	2	—	1	5
Prison, Borstal	2	3	1	5	3
Still in hospital or other ..	1	5	4	6	7
Totals	17	22	15	21	25

Table VII demonstrates the association between paternal strictness, as gleaned from patients' attitude and witnesses' reports, and ability to hold employment.

The pattern for reconviction is similar; family cohesion (significant), severity ratings (highly significant), I.Q. (just significant), and sensitivity to colour on the Rorschach (significant), and the score on Rorschach card 2 (just significant).

TABLE VIII

Reconviction, Clinical Severity and Family Cohesion

Recon-victed	0	1	2	3	4	Psychotic and Neurotic	Family affec-tionate	Family discord	In contact with some home	No home
Yes	0	0	2	7	9	1	2	5	8	4
No	4	15	26	20	9	7	18	45	7	11
Totals ..	4	15	28	27	18	8	20	50	15	15

Table VIII shows the high association between the psychiatric rating of severity and reconviction, and is interesting in view of the relationships also found between that rating and the Bristol Total maladjustment score. Reconviction numbers are as yet too small to detect any differences as far as maladjustment is concerned, but this and other associations may be clarified by the later follow-up studies planned. The table also shows the correlation of present family cohesion with reconviction.

The relationship between high I.Q. and reconviction is of great interest. It is probably due to the greater likelihood of the more intelligent to be severely disturbed before entering the unit, and to the fact that those of subnormal intelligence are more likely to have hospital treatment offered to them, and as few hospitals care to treat intelligent psychopaths, court action is usually necessary for residential care.

The Rorschach measures found to be related to reconviction were the use of colour, and the raised Severe Disturbance Scale score on Card II, mentioned above. These two measures were found to be nearly significantly interrelated. This tends to support the finding of Tong (45) that reaction to colour is the Rorschach measure most closely related to behaviour disturbance. It is usually claimed that the use of colour indicates emotional responsiveness and lability, rather than social deviation, and it is interesting that this early follow-up highlights those who committed offences shortly after leaving the hospital during a period of misbehaviour and stress. It seems possible that these two measures tend to separate those with overt misbehaviour from those with more covert symptoms.

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In view of the high correlation between clinical grading of severity and subsequent reconviction following discharge, it seemed desirable to check other factors possibly relating to severity: illegitimacy (highly significant) has been noted earlier; family cohesion (significant); and the Bristol Total maladjustment score (just significant). Although clinical severity was apparently a good predictive index to reconviction in this early follow-up, it too may be biased by the more severely disturbed who discharged themselves early without completing treatment. It is of interest that severity was not related to job holding which seems to indicate that job holding and reconviction are partially independent. The classical factors expected to be related to severity, such as parental separation, were not so found; present evidence of disturbance seemed to be the more important.

Type of Offence

Type of offence shows little tendency to be related to other variables, except for a possible association of brain damage with bodily violence (almost significant), and scores on Rorschach card IV where an analysis of variance revealed a just significant difference, the mean scores for property and bodily violence offenders being high, and for sexual offenders and others (family offenders) being low.

The association between type of offence and brain damage cannot be regarded as more than a possibility to be investigated further, since an overall test of significance shows no association. The general picture suggests that with the possible exception of one (sexual offences), the offences can be regarded as part of a non-specific delinquency pattern. This is borne out to some extent by the fact that reconviction and previous convictions are often for different types of offence, and agrees with a previous study on similar patients (11). Contrary to expectation there was no relation between type of offence and clinical sub-groups, M.M.P.I. scales, or Porteus Maze "Q" score.

The finding by Gibbens (20) that homosexuals tend to have greater verbal than performance I.Q. was not substantiated in the present study.

Relation to EEG Findings

Electroencephalographic abnormalities, both before and after injection of bemegride, were found not to be related to the main psychiatric or social variables from this survey. In particular there was no relationship between EEG abnormality and severity of disturbance, for the group of patients with normal EEGs contained proportionate numbers of patients from each grade of severity disturbance.

TABLE IX

EEG and Other Variables

	Clinical Severity		W.A.I.S. P–V*		Rorschach Card II*		Rorschach Card IV*		Bristol T*	
	0–2	3–4	−	+	−	+	−	+	−	+
Seizure	1	5	1	5	1	4	2	3	1	1
Ss+W	10	9	11	13	11	13	13	11	6	6
Delta and Theta ..	8	6	6	9	8	7	2	13	4	3
No Change	8	7	12	5	10	7	7	10	6	4

*The data for the psychological variables has been broken down into those values greater than, and those less than, the median for the total psychological data.

Table IX shows EEG findings compared with certain psychological variables. It will be seen that there is a tendency for the grosser and more

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reliable forms of EEG disturbance to be associated with a greater proportion of abnormality in the columns denoting psychological and clinical data. This tendency is particularly marked in the scores derived from performance-minus-verbal I.Q. This measure also showed many significant associations with other psychological variables especially from the Bristol Social Adjustment Guide, and the M.M.P.I. and these in turn tended to be related to each other and to EEG abnormalities. These variables are listed in the first cluster of Table X, tentatively labelled "extraversion".

TABLE X

Main Clusters of Psychological Variables

"EXTRAVERSION"

W.A.I.S.
Performance minus verbal I.Q.

Bristol Social Adjustment Scale
Outward expression of hostility to adults.
Anxiety for approval and acceptance.
Unforthcomingness (negatively).

M.M.P.I.
Hysteria, social introversion (negatively), psychopathic deviation, validity, (F scale), schizophrenia.

Rorschach
Psychopathy scale of antisocial content, use of colour, difficulty with Card II.

Porteus Maze
Q. score.

SECOND CLUSTER

Bristol Adjustment Scale
Hostility to children.
"Writing off" of adults.

Rorschach
Score on Card IV.

The meaning of differences between performance and verbal scores, disproportionately high in the present group, are not clear, but it is generally accepted that tests of performance abilities approximate more closely to "native intelligence" than do tests of verbal ability, which are likely to be influenced more by social learning. Wechsler (46) stated that adolescent psychopaths have higher performance than verbal scores on Wechsler tests, and a study by the Gluecks (24) has demonstrated this for the Wechsler Bellevue I. Himmelweit (29), using the progressive matrices and the Mill Hill Vocabulary, found a relationship between high intelligence-vocabulary ratio and extraversion, extraversion allegedly being a feature of psychopathic personalities (Eysenck, 15). A recent study by Black, Walton and Stevens (2) amplifies Himmelweit's findings, but suggest a slight exaggeration occurred owing to the introverts' greater reaction to the stress of the timed matrices used.

In the second cluster, there was a tendency for Delta and Theta as against Ss+W after injection to be associated with the overt expression of hostility and aggression as estimated from the Bristol Guides (hostility to peers, and "writing off" of adults), the Rorschach results, and M.M.P.I. results—scale Pd (positively) and K (negatively). A just significant relationship obtained between card IV of the Rorschach and Delta and Theta as opposed to Ss+W

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when the Chi-squared test was applied. This is important in view of the significant relationship found between card IV and hostility to peers—a severe variation of behaviour—as judged from the Bristol Guide. In general, it appeared that Ss+W were given as opposed to Delta and Theta by those who were more submissive and anxious to please. Unfortunately, there were insufficient data to look for any firm relationship between maladjustment as derived from the Bristol data, and EEG abnormalities.

The variables that appear to be associated most closely with EEG disturbance after bemegride injection, namely performance-minus-verbal I.Q., and difficulty with card II of the Rorschach, are relatively devoid of direct implications of antisocial traits. Rather they suggest emotional responsiveness, lack of inhibition and extraversion as such.

Our first, main cluster of psychological variables undoubtedly contains more than one independent variable and we need to distinguish anti-social role-taking as something partially independent from the concept of extraversion. Recent studies, using factor analysis of discriminance, have shown that the concept of extraversion, as developed from factor analytical studies, contains more than one factor (37), The concepts "psychopathy" and "hysteria" were formerly included in the meaning of the term "extraversion", and this recent work has shown that these attributes occur somewhat independently of one another.

Clinical Sub-groups

The lack of relationship between the clinical sub-groups suggested by the literature and other variables was disappointing. In particular neither parental separation (expected to be positive), nor results by EEG (expected to show lower frequences in the immature), reached significant levels, nor was there any relationship with the psychological clusters, with type of offence, or with follow-up in terms of reconviction and job holding. This could be due to: (1) The syndromes do not contain the important features, that is they are without treatment or predictive value; (2) The syndromes contain a number of factors in equal measure or consist of a number of factors that cancel each other out. The work of the Grants (25) supports this view; (3) Syndromes comprising psychopathy overlap so greatly that division into sub-groups is pointless, the entity of psychopathy being non-specific. The pattern of reconviction, and a previous study (11) agree with this; (4) So far as reconviction and employment are concerned, social factors after discharge matter more than the personality or character type.

Conclusions

This investigation was planned with the intention of outlining psychological, psychiatric and EEG characteristics that would be of diagnostic use in implementing the provisions of the Mental Health Act, and outlining clinical sub-groups which might have predictive value or respond differentially to contrasting treatment patterns. It was also hoped to investigate those psychological tests which might help clinical opinion to decide when psychopaths had improved sufficiently to take their part in the community once more. A comprehensive data sheet was devised so that this group could be compared with others in the literature, and various aetiological hypotheses could be checked with regard to recidivism.

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It must be admitted that no outstanding characteristics could be outlined which would set this group apart from other groups of simple delinquents. This group of boys showed all degrees of variation from normal behaviour, and just as there are no outstanding traits which characterize the group as a whole, there is also no definite point at which one could say that behaviour becomes psychopathic. These one hundred cases showed nearly all varieties of psychopathic behaviour noted in the literature, from pathological liars to those who practised their sex deviation by force. Among them were those who at follow-up had attempted or committed robbery with violence, rape, sodomy, attempted suicide, false pretences, and fraud. Compared with other studies the group appeared to be more disturbed and have a greater degree of unfavourable environmental circumstances.

The first intention of outlining characteristics helpful in psychiatric diagnostic practice was unsuccessful, for despite a differentiation of clinical sub-groups, said to be reproducible between one practitioner and another, these sub-groups were of little help in distinguishing between types of offence, or the effects of treatment at follow-up, and did not relate to other descriptive data. In the past such clinical groupings have led to much confusion in practice and in court. They have tended to rely heavily on historical data, whilst the significant relationships found in this study suggest that for the future it is at least as important to take account of present maladjustment and community help (in particular a home to return to even if the home is poor). These views are variously supported by Tong (44), Mannheim and Wilkins (31) and Stott (42, 43). The clinical grading of severity seemed most constructive and was also based mainly on present information. Similarly, the Bristol total maladjustment score (which rates maladjustment on the ward) and the presence of colour responses and raised Severe Disturbance Scale scores on Card II of the Rorschach showed signs of similar predictive value, whilst other aspects of the Rorschach seemed more useful in distinguishing between different types of offence. Although performance-minus-verbal I.Q. failed to correlate significantly with reconviction, it related to clinical ratings of severity of disturbance and other psychological variables. It is important to note at this juncture that both the clinician's severity scale, and also the Bristol observations are upon boys in unlocked open wards, incarceration being known to cause additional specific reaction patterns of its own. The Bristol adjustment scales are a direct attempt to record present evidence of behavioural maladjustment. Tong's work (44) on the predictive value of stress reactivity with Rampton patients is an attempt to quantify maladjustment at a physiological level, using much of what had previously been used by the clinician in his value judgments.

Psychoanalysts have long laid emphasis on past childhood neurotic symptoms becoming introjected at puberty, with delinquency as one outcome. The present study suggests an association (not reaching significance) between severity of disturbance and three or more childhood neurotic symptoms; but in keeping with our hypothesis that present factors are more important than past, neurotic symptoms as noted by nurses (Bristol syndromes of Depression, Miscellaneous Nervous Symptoms and Anxiety to Adults) are all related highly significantly to the Total maladjustment score, itself relating significantly to severity.

The EEG study showed a marked contrast between the total incidence of abnormalities after injection of bemegride in the various controls used (17 per cent.), and in the group of psychopathic admissions (73 per cent.) tested.

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Since at least some of the controls had good reason for a temporary abnormality, this difference is clinically helpful. The results showed that severity of EEG disturbance did not correlate significantly with severity of behavioural disturbance, but there was a tendency for severity to relate to psychological variables associated with reconviction. It is possible that by using data from the subsequent follow-up, greater correlation between certain of these variables will be found.

Clinically there appeared to be no good reason why some of the Grade 3 and 4 patients who were grossly immature or who had well authenticated brain damage had apparently normal EEGs. There was in fact, no correlation between brain damage and EEG abnormality. Like all tests in this field, the EEG when used alone is of limited value; it should be used in conjunction with other tests. It must be remembered that with relatively small numbers of patients as are here reported only large effects will be noted. It is encouraging to note that several findings correlated with reconviction and unemployment, and it seems possible that with the results of latter follow-up the tests used will be increasingly useful in assessing degrees of psychopathy and indicating improved social adjustment.

Summary

This paper discusses the results of investigations with 100 admissions to a Psychopathic Unit from psychiatric, psychological and electroencephalographic viewpoints. Relationships between the data from these fields and a follow-up study are reported and discussed. Offences seemed part of a non-specific disorder, and the clinical syndromes used correlated poorly with other variables, a clinical rating of severity of psychopathic disorder relating more significantly with other results than any clinical sub-groups. Present estimation of maladjustment and the cohesion of the family to which the patient would return were especially found to relate more to reconviction and job holding after discharge than were historical data such as parental separation, although such evidence of gross early environmental disturbance was common. Using bemegride activation, marked differences were found between a group of psychopaths and a group of controls, but individually the abnormalities did not significantly relate to degree of behaviour disturbance. Although the clinical sub-groups used were not found helpful, two clusters of psychological variables emerged which tended to be related to EEG findings and success at follow-up.

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